

REMARKS

The Applicants are filing this Amendment and Response in reply to the Office Action mailed March 24, 2009, in which the Examiner rejected all pending claims 1-20. By this Amendment and Response, the Applicants have amended claims 1-5, 8, 10-14, 16, 17, 19, and 20, and cancelled claim 9, to clarify features and expedite prosecution. The Applicants also are amending the abstract of the specification. No new matter has been added by way of these amendments. Upon entry of the amendments, claims 1-8 and 10-20 will be pending in the present application. Based on the foregoing amendments and the following remarks, the Applicants respectfully request allowance of all pending claims.

In the Office Action, the Examiner objected to the Abstract, the Specification, and claims 1, 8, and 19 for various alleged informalities. The Examiner also rejected 8-18, 19 and 20 under 35 U.S.C. § 101, asserting that the claimed invention is directed to non-statutory subject matter. Furthermore, The Examiner rejected claim 4 under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the enablement requirement. The Examiner also rejected claims 4-6, 12, 13, and 17 under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Additionally, the Examiner rejected claims 1, 7-10, 14-16, 19, and 20 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Publication No. 2002/0091746 by Umberger et al., (hereinafter "Umberger"). Finally, the Examiner rejected the following claims under 35 U.S.C. § 103(a): claim 4 as being unpatentable over Umberger; claim 2 as being unpatentable over Umberger as applied in claim 1, and in view of U.S. Patent No. 7,159,071 to Ikeuchi et al. (hereinafter "Ikeuchi"); claim 3 as being unpatentable over Umberger as applied in claim 1, and in view of U.S. Patent Publication No. 2004/0205102 by Elliott, Jr. et al. (hereinafter "Elliott"); claims 5, 6, 12, 13 and 17 as being unpatentable over Umberger as applied in claims 1, 8 and 16, and in view of U.S. Patent No. 6,157,963 to Courtright II et al. (hereinafter "Courtright"); and claims 11 and 18 as being unpatentable over Umberger as applied

in claims 8 and 16, and in view of U.S. Patent No. 7,152,142 to Guha et al. (hereinafter “Guha”). These objections and rejections are discussed in further detail below.

Objections

The Examiner objected to the “abstract of the disclosure,” pursuant to M.P.E.P. § 608.01(b), alleging that “the content of the specification failed to disclose the technical disclosure of the patent and did not include which is new in the art to which the invention pertains.” Office Action, page 2. While the Applicants do not concede the correctness of the objection, the Applicants have amended the abstract in an effort to advance prosecution. In view of this amendment, the Applicants respectfully request the Examiner withdraw the objection.

The Examiner also objected to the specification, alleging that it failed “to provide proper antecedent basis for the claimed subject matter.” *Id.* (citing 37 C.F.R. § 1.75(d)(1) and M.P.E.P. § 608.01(o)). The Examiner clarified by stating that, “[f]or example, claim 19 recited ‘usable medium’, however, the specification did not provide proper antecedent basis for the recited limitation.” *Id.* Although Applicants do not concede the correctness of the objection, the Applicants have amended claim 19 (and also refer the Examiner to paragraph 34, for example, of the specification). In view of this amendment and associated support in the specification, the Applicants respectfully request the Examiner withdraw the instant objection.

Lastly, the Examiner objected to claims 1, 8, and 19 “because of the following informalities: ‘assign priority of tasks’ should be: ‘assign priority to tasks’.” Office Action, page 2 (emphasis in original). However, the Applicants respectfully choose not to incorporate this change into the claims at this time because “priority of tasks” is a meaningful phrase. Further, “priority of tasks” is appropriate language, as the term “priority of tasks” is established in the present technique. While the alternate phrase

“priority to tasks” may also be acceptable, the Applicants respectfully request the Examiner withdraw the instant objection without requiring amendment.

Claim Rejections Under 35 U.S.C. § 101

The Examiner rejected claims 8-18 under 35 U.S.C. § 101, asserting that the claimed invention is directed to non-statutory subject matter. The Examiner also rejected claims 19 and 20 under § 101 with the same assertion of non-statutory subject matter apparently for a similar yet different rationale. The Applicants respectfully traverse these rejections.

Deficiencies of the Rejections

In formulating the rejection of claims 8-18, the Examiner specifically stated:

Claims 8-18 are rejected under 35 U.S.C. 101 because the claimed invention are directed to array controller, which appearing to be comprised of software alone without claiming associated *computer hardware* required for execution. For example, the specification paragraph [0029] suggested that *the array controller as recited in claims 8, 16 is program logic* which is software, and the body of the array controller comprises control logic and codes, which also are software. Software per se when claiming without any computer hardware required for execution are directed to non-statutory subject matter. Thus, claims 8 and 16 are directed to a non-statutory subject matter. Claims 9-15 and 17-18 are rejected because they are failed to cure the deficiencies from their respective parent claims.

Office Action, page 3 (emphasis added).

First, the Applicants traverse the Examiner’s contention that the specification discloses the array controller as only program logic software. Indeed, it is readily apparent to the skilled artisan that such logic is stored in memory and that a physical processor is inherently employed to execute the associated code, for example.

Moreover, the specification treats the phrase “control logic” in the present context as a physical manifestation having executable code. Second, while the Applicants did not agree with the Examiner’s rejection, independent claim 8 has been amended to clarify the structure (computer hardware), and thus Applicants directly respond to the Examiner’s statements regarding lack of computer hardware. Third, claim 8, especially as amended, plainly encompasses an apparatus, i.e., at least a memory. While claim 8 is not a method claim, it satisfies the *In re Bilski* test because it is clearly tied to an apparatus (i.e., again, at least a memory device). See *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc) (explaining that subject matter is patentable under 35 U.S.C. § 101 if “it is tied to a particular machine or apparatus”). To be sure, independent claim 8, as amended, is statutory patentable subject matter

With regard the rejection claims 19 and 20, the Examiner specifically stated:

As per claims 19-20, “an article of manufacture” comprising computer readable program code embedded in a controller usable medium. However, as specified in the specification, paragraph [0034], controller usable mediums could include a carrier wave signal. The program code embedded in a carrier wave signal does not produce a tangible result. Therefore, claims 19-20 are directed to non-statutory subject matter.

Office Action, page 3.

To the contrary, the Applicants note that paragraph 34 of the specification does not teach a carrier wave signal. Nevertheless, this point is moot, as claim 19 is amended to clarify that the claim encompasses a computer readable medium. It should be noted that the Federal Circuit did not specifically address software patents in *Bilski*, stating that “the facts here would be largely unhelpful in illuminating the distinctions between those software claims that are patent-eligible and those that are not.” *Bilski* (FN. 23). Thus, *Bilski* does not change the precedents concerning the patent-eligibility of software stored on computer-readable media.

The M.P.E.P. § 2106.01 states that “[w]hen functional descriptive material is recorded on some computer-readable medium, it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized.” *Id.* This is consistent with the findings of the Federal Circuit in *In re Beauregard*, 53 F.3d 1583, 35 U.S.P.Q.2d 1383 (Fed. Cir. 1995) (noting the Patent Office's finding that “computer programs embodied in a tangible medium, such as floppy diskettes, are patentable subject matter under 35 U.S.C. § 101”). Moreover, the preamble of claim 1 limits the claim to “an article of manufacture.” *See, e.g., Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989); *Pac-Tec Inc. v. Amerace Corp.*, 903 F.2d 796, 801, 14 USPQ2d 1871, 1876 (Fed. Cir. 1990) (determining that preamble language that constitutes a structural limitation is actually part of the claimed invention). For at least these reasons, the recited features of the present method claims are statutory subject matter.

Request Withdrawal of the Rejections

For at least the reasons discussed above, the Applicants respectfully assert that claims 8 and 10-20 are patent eligible subject matter under 35 U.S.C. § 101. Therefore, the Applicants respectfully request that the Examiner withdraw the rejections under 35 U.S.C. § 101 and allow claims 8 and 10-20.

Claim Rejections under 35 U.S.C. § 112, First Paragraph

The Examiner rejected claim 4 under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the enablement requirement. The Applicants respectfully traverse this rejection.

Legal Precedent

To reject a claim under the first paragraph of 35 U.S.C. § 112 regarding enablement, the Examiner has the burden to establish a reasonable basis to question

the enablement provided for the claimed invention. *In re Wright*, 999 F.2d 1557, 1562, 27 U.S.P.Q.2d 1510, 1513 (Fed. Cir. 1993). If the specification contains a teaching of the manner and process of making and using an invention in terms corresponding in scope to those used in the claims, then the claims are in compliance with the enablement requirement of the first paragraph of 35 U.S.C. § 112. *See* M.P.E.P. § 2164.04. In other words, the only standard as to whether a claim is enabled by the specification is whether the experimentation needed to practice the invention is undue or reasonable. *See Mineral Separation v. Hyde*, 242 U.S. 261, 270 (1916); M.P.E.P. § 2164.01.

Deficiencies of the Rejections

In formulating the rejection, the Examiner specifically stated:

As per claim 4, lines 6, 8-13, recited "measuring a current utilization value", "executing a queried task that has an assigned maximum allowable utilization value higher than the current utilization value", and "deferring to a next task on the queue, if any, for a queried task that has an assigned maximum allowable utilization value lesser than the current utilization value". However, the specification fails to describe in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. For example, let the "measuring a current utilization value" is 30%, "the maximum allowable utilization value" of the task is 75%, in this scenarios one of the ordinary skill in the art would not be able to use the claimed limitation "executing a queried task that has an assigned maximum allowable utilization value higher than the current utilization value" (i.e. the current measuring indicated that the system current utilization value is 30%, therefore, the available value that the system capable for perform the task is 70%, in that case, the system will execute the task with maximum allowable utilization value is lesser or equal to 70%, but can not execute the task with maximum allowable utilization value is higher than 70%, thus it is clearly shown that even though assigned maximum allowable utilization

value higher than the current utilization value (75% higher than 30%), but the concept won't work because the system is given of 100% to support task and it already used 30%, the availability is 70%, and the task need 75%, the system won't be able to execute the task). Also with respect to "deferring to a next task on the queue, if any, for a queried task that has an assigned maximum allowable utilization value lesser than the current utilization value", the same rational can be applied. Therefore, claim 4 is contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. For the purposed of examination, examiner will interpreted the recited limitation as "measuring a current available value", "executing a queried task that has an assigned maximum allowable utilization value higher than the current available value", and "deferring to a next task on the queue, if any, for a queried task that has an assigned maximum allowable utilization value lesser than the current available value".

Office Action, pages 4 and 5 (emphasis in original). The Applicants respectfully traverse the Examiner's analysis and contentions.

The Applicants respectfully assert that the Examiner has incorrectly interpreted claim 4 and the associated disclosure in the specification. The maximum allowable utilization value for a given task is *not* necessarily the amount of utilization *needed* or that would be *used* to execute the task. Instead, the maximum allowable utilization value is a value to set a priority of the task. *See, e.g.*, Specification, ¶ 27. It is a state of utilization (i.e., available utilization) of an interface of the storage array at which the task will be authorized to execute. *See, e.g., id.* at ¶¶ 11-16, 32, and 33. Indeed, the Applicants have developed a unique technique for establishing priority of tasks.

The maximum allowable utilization value may have nothing to do with the amount of utilization (e.g., of I/O bandwidth) needed to implement the task. Again, the numerical value assigned for the maximum allowable utilization of a given task is to designate the importance of the task. *See, e.g., id.* at ¶ 27 (explaining that the “highest priority tasks or processes are set with the highest allowable utilization and the lowest priority tasks or processes are set with the lowest allowable utilization.”). For example, a task may require only a small utilization (say, for example, 1% or less of the I/O bandwidth) to actually be executed, but be assigned a maximum allowable of utilization of 90 %, for example, if it is a higher priority task, or assigned a maximum allowable of utilization of 10 %, for example, if it is a lower priority task. *See, e.g., id.* at ¶ 20 (“The task management utility 312 assigns priority of tasks executable on the storage array based on the measured parameter.”); ¶ 27.

As explained throughout the specification, the priority of a given task is assigned relative to a parameter indicative of interface workload to a storage system. *See, e.g., id.* at ¶¶ 11-16, 32, and 33. Whether a task will be executed or deferred depends on the state of the system and not necessarily the amount of utilization needed to actually execute the task. *See, e.g., id.* at ¶¶ 11-16, 20, and 27. This may be understood to be advantageous, for example, that only high priority tasks are executed when the current available utilization of the system is high, and that more tasks including lower priority tasks may be executed when the current utilization of the system is low. *See, e.g., id.* at ¶ 27 (“Accordingly, as the measured utilization level increases, the only tasks that are enabled to execute are the highest priority tasks, and the high priority processes are executed in the order of placement on the queue. As the measured utilization level decreases, the older lower priority processes are favored.”). Thus, claim 4 does not require undue or unreasonable experimentation by the skilled artisan and fully meets the enablement requirement.

Request Withdrawal of the Rejection

For at least the reasons discussed above, the Applicants respectfully assert that claim 4 satisfies 35 U.S.C. § 112, first paragraph. Therefore, the Applicants respectfully request the Examiner to withdraw the rejections under 35 U.S.C. § 112, first paragraph, and allow claim 4.

Claim Rejections under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected claims 4-6, 12, 13, and 17 under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Applicants respectfully traverse this rejection.

Legal Precedent

In reviewing a claim for compliance with 35 U.S.C. § 112, second paragraph, the examiner must consider the claim as a whole to determine whether the claim apprises one of ordinary skill in the art of its scope and, therefore, serves the notice function required by 35 U.S.C. § 112, second paragraph, by providing clear warning to others as to what constitutes infringement of the patent. *See Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372, 1379, 55 U.S.P.Q.2d 1279, 1283 (Fed. Cir. 2000). Only when a claim remains insolubly ambiguous without a discernible meaning after all reasonable attempts at construction must a court declare it indefinite. *See Metabolite Labs., Inc. v. Lab. Corp. of Am. Holdings*, 370 F.3d 1354, 1366, 71 U.S.P.Q.2d 1081, 1089 (Fed. Cir. 2004); *but see Ex parte Miyazaki*, 89 U.S.P.Q.2d 1207 (B.P.A.I. 2008) (holding that a claim in a pending patent application is indefinite under 35 U.S.C. § 112, second paragraph, if the claim is amenable to two or more plausible claim constructions).

Deficiencies of the Rejections

In formulating the rejection, the Examiner specifically stated:

- a. The following terms lacks antecedent basis:
 - i. the individual tasks - claim 4;
 - ii. the utilization based queue -- claims 5, 12;
- b. The claim language in the following claims is not clearly understood:
 - i. as per claim 6, lines 5-7, it is not clearly understood what is meant by "maintaining a utilization task queue for queuing and executing tasks, when the high priority queue is empty, in an order based in part on the order of queuing and in part on assigned allowable utilization value of a task and a measured current utilization value".
 - ii. as per claims 13 and 17, they have the same deficiency as claim 6 above. Appropriate correction is required.

Office Action, pages 5 and 6. The Applicants respectfully traverse these rejections.

The Applicants have amended claims 5 and 12, and believe the Examiner's assertions of lack of antecedent basis with regard to these claims to be moot. Further, claims 6, 13, and 17 are neither insolubly ambiguous nor subject to multiple plausible meanings as to support an indefiniteness rejection. Further, the Applicants respectfully refer the Examiner to paragraphs 9 (last 3 lines) and 17 of the specification for discussion related to these claims. In view of the foregoing, the pending claims are plainly not indefinite.

Request Withdrawal of the Rejections

For at least these reasons, claims 5, 6, 12, 13, and 17 satisfy 35 U.S.C. § 112, second paragraph. Accordingly, the Applicants respectfully request withdrawal of the rejections under 35 U.S.C. § 112, second paragraph, and allowance of these claims.

Claim Rejections under 35 U.S.C. § 102

The Examiner rejected claims 1, 7-10, 14-16, 19, and 20 under 35 U.S.C. 102(b) as being anticipated by Umberger. The Applicants respectfully traverse this rejection.

Legal Precedent

Anticipation under 35 U.S.C. § 102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985). A single reference must teach each and every limitation of the rejected claim. *Atlas Powder v. E.I. duPont de Nemours & Co.*, 750 F.2d 1569, 224 U.S.P.Q. 409 (Fed. Cir. 1984). Indeed, the prior art reference must show the *identical* invention "in as complete detail as contained in the ... claim" to support a prima facie case of anticipation. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q. 2d 1913,1920 (Fed. Cir. 1989).

Deficiencies of the Rejection

All independent claims (claims 1, 8, 16, and 20), as amended, generally recite measuring a parameter indicative of an *interface* (e.g., I/O) workload to a storage array, and establishing priority of tasks for the storage array relative to the measured I/O parameter. Conversely, Umberger teaches an optimization of computational *processing*, and does not set priority of tasks based on interface or I/O availability. See e.g., Umberger, Abstract (avoiding *processing* bottlenecks); ¶¶ 5 and 6 (allocating *processing* power); ¶ 65 (evaluating workload relative to available *processing* power). For these reasons alone, Umberger cannot anticipate pending claims 1-8 and 10-20.

In addition, independent claims 1, 8, 16, and 20, as amended, generally recite assigning a value (i.e., a threshold) *of the parameter to each task at which the task will be authorized to execute*. The independent claims generally recite that the assigned value or threshold is *indicative of importance or priority* of the task, and that when the measured parameter value reaches the assigned value of a given task, the task will be

allowed to execute. In contrast, Umberger is absolutely devoid of these unique features of assigning a value to a task *in terms of the state* (i.e., available I/O) of the storage array to establish priority of tasks. While Umberger does consider available processing power, the percentages assigned to the Umberger workloads or tasks are processing *requirements* of executing the given workload or task, and not an assigned value to indicate *importance* of the task. See e.g., Umberger, ¶¶ 62 and 65. For these additional reasons, Umberger cannot anticipate pending claims 1-8 and 10-20.

Request Withdrawal of the Rejection

For at least the reasons discussed above, Umberger cannot anticipate independent claims 1, 8, 16, and 19, or their dependent claims. Accordingly, the Applicants respectfully request the Examiner to withdraw the rejection under 35 U.S.C. § 102, and allow all pending claims.

Claim Rejections under 35 U.S.C. § 103(a)

The Examiner rejected under 35 U.S.C. § 103(a): claim 4 as being unpatentable over Umberger; claim 2 as being unpatentable over Umberger as applied in claim 1, and in view of Ikeuchi; claim 3 as being unpatentable over Umberger as applied in claim 1, and in view of Elliott; claims 5, 6, 12, 13 and 17 as being unpatentable over Umberger as applied in claims 1, 8 and 16, and in view of Courtright; and claims 11 and 18 as being unpatentable over Umberger as applied in claims 8 and 16, and in view of Guha. The Applicants respectfully traverse these rejections.

Legal Precedent

The burden of establishing a prima facie case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (B.P.A.I. 1979). To establish prima facie obviousness, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 U.S.P.Q. 580 (C.C.P.A. 1974). Moreover, obviousness cannot be established by a mere showing that each claimed element is

present in the prior art. *See KSR Int'l Co. v. Teleflex, Inc.*, No. 04-1350, 550 U.S. 398, 82 U.S.P.Q.2d 1385 (2007). The Examiner must cite a compelling reason why a person having ordinary skill in the art would combine known elements in order to support a proper rejection under 35 U.S.C. § 103. *Id.* Further, the Supreme Court stated that the obviousness analysis should be explicit. *See KSR Int'l Co.* at 398 (explaining that “rejections based on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

Deficiencies of the Rejections

In formulating the various rejections under 35 U.S.C. § 103(a), the Examiner cited several secondary references (Ikeuchi, Elliott, Courtright, Guha). However, none of the secondary references (nor the Examiner's discussion of the primary reference Umberger alone with regard to dependent claim 4) remedy the deficiencies of Umberger discussed above with regard to the independent claims. Ikeuchi is directed to balancing of I/O and Courtright is directed to prioritizing/scheduling I/O, which are features that do not read on the present claims and could not be reasonably incorporated into Umberger. *See, e.g., Ikeuchi*, Abstract; col. 1, lines 16-24; Courtright, Abstract. Elliot is directed to network management bandwidth and Guha is directed to a data storage (i.e., RAID) organization scheme. *See, e.g., Elliot*, Abstract; Guha, Abstract. None of the reference teaches establishing priorities based on an I/O workload parameter and assigning values to a task, as claimed. Thus, none of the cited references including Umberger and the secondary references, whether taken alone or in any sort of hypothetical combination, teach all of the elements of the independent claims 1, 8, 12, and 19. Therefore, the Applicants respectfully request the Examiner to withdraw the rejections under 35 U.S.C. § 103 and allow all pending claims.

Conclusion

The Applicants respectfully assert that all pending claims are in condition for allowance. However, if the Examiner believes certain amendments are necessary to clarify the present claims or if the Examiner wishes to resolve any other issues by way of a telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

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